

A new look at Titan's zonal winds from Cassini radio occultations

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We use the existing thirteen Cassini radio-occultation soundings to construct a meridional cross section of geopotential height vs. pressure and latitude. The assumption of balanced flow permits the construction of a similar cross section of zonal winds, from near the surface to the 0.1-mbar level. In the lower troposphere, the winds are $\sim 10 \text{ m s}^{-1}$, except within 20° of the equator, where they are much smaller. The winds increase higher up in the troposphere to nearly 40 m s^{-1} in the tropopause region, but then decay rapidly in the lower stratosphere to near-zero values at 20 mbar ($\sim 80 \text{ km}$), reminiscent of the Huygens Doppler Wind Experiment result. This null zone extends over most latitudes, except for limited bands at mid-latitudes. Higher up in the stratosphere, the winds become larger. They are highest in the northern (winter) hemisphere. We compare the occultation results with the DWE and CIRS retrievals and discuss the similarities and differences among the data sets.